

Ex Ante Project Evaluation and the Complexity of Early Decision-Making

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Abstract This paper looks beyond more traditional evaluation activities to focus primarily on evaluation up front. It suggests that the early appraisal of an investment case or a project should apply essentially the same evaluation criteria that will be used in ex post evaluation, and thus increase the likelihood of a successful project outcome. However, the initial plan might be altered as result of subsequent analysis, assessment, negotiation, positioning, and the exercise of power. The last part of this paper presents an empirical study of 23 projects, which examines the complexity of processes that occur in the idea- and decision phases.

Keywords Ex ante evaluation · Decision making · Public investment projects

On Evaluation in General

An investment case, a process or a project is typically divided into three distinct phases. In the beginning, an idea and decision phase lasts until the final decision to implement is made. The implementation phase follows, continuing until the project's outputs are realized. The goal could be to build a building, to reorganize an organization, or to have a student pass a final exam. Finally, there is an operational phase, in which the benefits of the project are realized or revenue comes in. This process is illustrated in Fig. 1.

Experience indicates that today, most evaluation activities occur in the implementation phase or just after its conclusion, options designated interim evaluation and final

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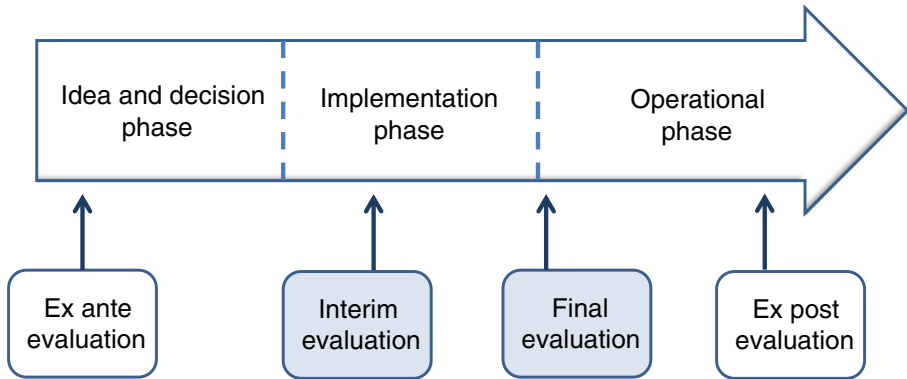


Fig. 1 Evaluation of an undertaking at different points in time

evaluation, respectively. This is puzzling because the implementation phase is the period in which the project is least likely to benefit from an evaluation (Samset 2003). An interim evaluation can help avoid or correct mistakes during a project, that is, it provides management information. A final evaluation assesses the results at the conclusion of the implementation phase, that is, it provides control information.

It is a paradox that systematic *ex ante* and *ex post* evaluations are rarely used. *Ex ante* evaluation provides strategic information about the main choices at an early stage, when the possibility to influence the course of an undertaking is greatest. Such an approach attempts to find the best approach or conceptual solution of possible alternatives, which is essential. *Ex post* evaluation undertaken well into the operational phase will provide learning information to improve design and decisions for similar projects in the future, which is also valuable (Andersen et al. 2008).

Ex ante evaluation is a broad initial assessment aimed at identifying which alternative will yield the greatest benefit from an intended investment. More commonly, considerable resources are used on detailed planning of a single, specific solution, whereas alternatives are not (or are inadequately) assessed early on. Consequently, there is no adequate basis for concluding that the preferred alternative is the best choice.

The goal of *ex post* evaluation is first and most importantly to assess the lessons learned in an undertaking. The motivation for using *ex post* evaluation is principally that it contributes to double loop learning. Consequently, the evaluation of a single project is seldom sufficient; it is necessary to evaluate several similar projects. However, this is not common, and the use of evaluation for learning purposes is not encouraging (Schindler and Eppler 2003).

Business, particularly industries, are better at both *ex ante* and *ex post* evaluation, with their *ex ante* market forecasts and *ex post* user surveys. However, these are relatively limited assessments in which profitability is the paramount objective and demand and user satisfaction are key evaluation criteria. In such cases, a narrow economic incentive clearly motivates the conduct of such studies.

Incentives in public investment projects are not as clear. The goal often is more compound and complex than the industry's goal of profitability. Attention is focussed on socio-economic benefit, but individuals are not made accountable to the same extent in relation to the achievement of objectives, as is the case in business. Consequently,

there is no clear tradition for such evaluations. One notable exception is the Norwegian Ministry of Finance who introduced a scheme in 2000 for ex ante evaluation of the country's largest public investment projects, the so-called quality assurance scheme (Samset et al. 2006). Fifteen years later, 260 projects have been exposed to this QA scheme. In coming years, a large number of ex post evaluations will be made of the same projects. The study presented in the latter part of this paper is based on material from this scheme.

Ex Ante Evaluation

This suggests that evaluation should be conducted early on because the possibility of influencing a process is greatest at the outset and diminishes thereafter. However, how—and when? At the conclusion of the project or while it is underway? Obviously, the goal is to establish the quality of what has been produced, whether it is in for example school education, the implementation of a reform, or the construction of a house. During implementation? Yes, provided there is a distinct need for it, such as for example before the project enters a new phase, when there is a change of management, when there are indications that the project is moving in the wrong direction, or on suspicion of illegal conduct.

We suggest an evaluation at the very beginning, before the project is initiated. The justification for ex ante evaluation is a desire to clarify the major questions that will determine the terms of planning. The benefits to be accrued were demonstrated by a World Bank evaluation of more than 1000 investment cases. The evaluation showed that as many as 80 % of the cases that conducted a thorough feasibility study and secured “Quality at Entry” were successful, whereas only 35 % of those with poor preparation were successful (The World Bank 1997).

The benefit of ex ante evaluation is principally related to whether one is able to identify the best solution to the problem at hand and avoid expensive and ineffective solutions. This will be based on estimates of the project's effects. Such estimates are useful for management decisions during implementation and are benchmark information for interim and ex post evaluations. Ex ante evaluation may also be useful for studying different scenarios and the effects of changes in certain parameters during the course of implementation. Systematic sensitivity analysis is all too little used, even in major, extensive projects (Jovanovic 1999).

Each investment case or project represents only one of several possible concepts that may be realized. In advance, other concepts may have been assessed but rejected in favour of the one preferred. After the project is completed, it is evaluated in relation to planned and projected goals and effects and to the ex ante situation—but rarely in relation to the counterfactual, i.e., what the situation would have been had the project not been realized (Harberger 1997). The reason for this is first and most importantly that people's preference is commonly to invest in something new. However, seen in retrospect, the zero option has many times proved to be the most profitable choice, suggesting that an ex ante evaluation should also review the zero option because it affords a basis of comparison for assessing future benefit.

Evaluation Based on Insufficient Information

In an *ex ante* evaluation, much must be based on assumptions because fewer facts are available. It is more bounded concerning history, facts and interpretations, leading to a selection of decision premises influenced by organization structures and actors' roles, as noted by Simon (1957). Lack of information leads to greater reliance on experience, on opinion or at worst on guesswork. This is a disadvantage but not a hindrance. The combination of facts and well-founded assumptions are the best you can provide in an early phase. However, an *ex ante* evaluation can contribute systematic generation and analysis of such information. The assumption is that this process will provide better results than without systematic analysis, although the information base is weak. There is a large literature in this area, for example, Goodwin and Wright (1991); Bazerman (1994), and Williams, and Sunnevaag (2009).

As mentioned, *ex ante* evaluation occurs when principal decisions are made and the possibility of making changes is greatest—but when uncertainty is greatest and the information basis is the most limited. What matters then is which *type* of information is needed. Because the major focus is on the problem and the needs that the project is meant to meet, there is a lesser need for *detailed knowledge* of the alternative solutions to the problem.

This illustrates a dilemma because most projects start out with only one specific conceptual solution to a problem. Much of the information generated is associated with that particular solution. Indeed, in many cases, the amount of specific, detailed information contributes to freezing the original choice of concept to the extent that it will be the eventually realized option. In all too few cases, other possible concepts are identified and analysed sufficiently.

Concerning the information needs in *ex ante* evaluation, information production often outstrips needs—one asks for more although the needed information is already there (Feldman and March 1981). Experience suggests that in the earliest parts of the process, our concern should be to understand the problem in its context and the needs and interests of the affected parties, to design a sound, strategic solution and assess possibilities and risks. Therefore, at the outset, the need is first and most importantly to establish perspective. Intuition, creativity and imagination can then be more valuable than exact, factual information. One could therefore turn the problem around and argue that the lack of information early on can actually, rather than a hindrance, be a benefit by providing focus and flexibility to the analysis.

Moreover, the validity of information may be a problem. It is obvious, as experience confirms, that the more precise information is, the more rapidly it becomes obsolete. It is tempting to speak of information half-life. For example, in a rapidly expanding market, the value of information on demand as a basis for planning may depreciate within a few days. At the same time, the validity of qualitative measures often is more durable than precise quantitative information. Consider, for example, the basic perceptions of the needs of user groups. We may know little about the urgency of the need but can be certain that it will persist for a long time. Therefore, it may be included in initial assessments.

Omitting details and less-relevant information helps avoid *analysis paralysis*. This is yet another argument for avoiding drowning the initial process with detailed, quantitative information. The lack of quantitative information *ex ante* leads to no great lasting

problem. The need for precise and detailed information increases with the advance of the process. Later, such information will be more readily available (Williams et al. 2009).

Commonplace opinion holds that the quality of a decision base is decisive for decisions. However, opinion varies on the meaning of ‘the quality of a decision base’. Experience suggests that decision makers often are less affected by decision bases than what one would think is desirable. Studies have shown that even when good decision bases are available, decisions are largely more influenced by the decision-maker’s intuition and personal or political preferences than by facts and analyses (Feldman and March 1981; Henden 2004; Mintzberg 2000). The practical implications of this are not necessarily disastrous. Several studies have shown that in many situations, intuition is preferable to rational analysis, particularly when the decision situation is complex, as is often the case in large investment projects. The assumption then is that intuition is based on experience and training. If the decision maker has the needed relevant professional experience in the sectors involved, intuition can help make sound decisions more rapidly. However, we cannot expect effective intuition without thorough knowledge of the theme at hand. In turn, that characteristic involves many years of experience combined with workable analyses.

Early on, it is essential to establish the best possible understanding of reality as a basis for identifying a suitable strategy. Subsequent critical steps include identifying the overall framework conditions that should guide subsequent decisions on the choice of concept and then the necessary framework conditions that should guide the planning and shaping of the project. That framework and conditions are the specific solution of the problem at hand—in other words, what the project is to deliver. In such a stepwise process, it is advantageous to choose an approach with corresponding increases in degree of detail and level of precision of information. The challenge is to acquire the essentials and limit the magnitude of what is communicated. This improves communication and increases the likelihood of the evaluation results being used. The Pareto Principle, also known as the 80–20 rule, may be used to illustrate information needs. The notion is that in a cause-effect relationship, a vital few causes lead to the greater part of the consequences. To clarify these causes is the central challenge.

Some Evaluation Criteria

An evaluation involves an assessment employing specific evaluation criteria and measures against standards or expected values such as knowledge and proficiency relative to learning goals or effects relative to strategic plans. A much-used evaluation model is based on five evaluation criteria that together express the degree of success, OECD (2002).

Evaluation according to this evaluation model highlights (1) the need for the project (relevance), (2) whether the uses of resources and time are reasonable (efficiency), (3) whether expectations are fulfilled (effectiveness), (4) what other positive or negative effects may occur because of the project (impacts), and (5) whether the positive effects persist after the conclusion of the project (sustainability).

Evaluation typically involves a process in which overriding evaluation criteria are disaggregated into more-detailed evaluation questions that are relevant to the conditions to be evaluated. Then, information is acquired that answers the questions. Finally, the

information is aggregated to support conclusions relative to the overriding evaluation criteria (Fig. 2).

This is an example of goal-oriented evaluation, which is one of many possible approaches to evaluation. The model is principally intended for application in the ex post situation, but it conceivably could be even more beneficial ex ante, in the front-end phase. The question that arises is to what extent have we sufficient information at an early stage to be able to apply these evaluation criteria in an ex ante evaluation of a project.

Considering *efficiency*, it is likely that we might have an accurate perception about the project's cost and ultimate outputs, but there is little chance of assessing whether there is a reasonable correlation between them. Likewise, it is not known whether the conditions in the implementation phase will permit achievement of the desired result. Not least, the difficulties of planners and decision makers in estimating realistic costs provide a clear message that we often have a poor basis for assessing effectiveness at an early stage.

The situation is much the same for efficiency or goal achievement. We are expected to have a clear idea about the first-order effects that we want to achieve with the project, but in this area, we are also notoriously bad at producing realistic estimates and estimating the effect of external factors that could affect the process and thus the achievement of objectives.

It is even more difficult to estimate *impacts* early on. Studying similar projects doubtless provides knowledge based on experience. However, we then are likely to face conditions that are difficult to predict and may require imagination and ability to guess beyond our capabilities.

The situation for *relevance* differs. Early on, common sense combined with for example studies of priorities and needs in society, market demands, legislation and regulations, can provide a solid picture at an early stage of whether the measure is relevant. However, this will require openness and a thorough analysis at the beginning. Additionally, needs and priorities clearly may change in the future and may be difficult to predict.

Finally, future *sustainability* is somewhat more difficult to assess. However, the question is closely associated with the relevance of a project. Moreover, people tend to do reasonably well in realistically assessing future needs and resources, not least in the form of cash flow analyses.

The conclusion then is that with reasonable effort, we can obtain a good picture at an early stage of whether a proposed project is relevant and sustainable, but to a greater

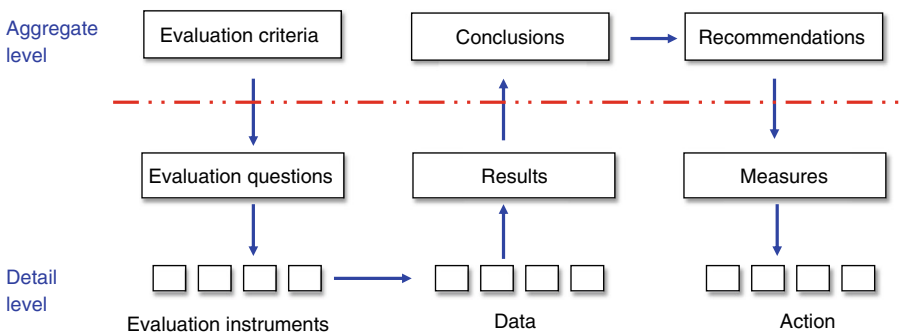


Fig. 2 Evaluation is part of an information process based on overriding questions and, through analyses and decision making, results in actions at the detail level

degree, we must disregard the other three criteria. The good news is that relevance and sustainability are precisely the two aspects that are most crucial to whether a project will succeed. Consequently, such a delimitation of an ex ante evaluation will, therefore, be the minimalist answer to what might be an appropriate approach, not least because the benefit relative to resource allocation will be quite high.

Decisions in the Front-end Phases of Major Public Investment Projects

The discussion above concerns improving the basis for planning and decision making early on based on ex ante evaluation. The picture is simplified by being limited to goal management techniques developed in the implementation of projects. However, an ex ante evaluation that is conducted at a sufficiently early point in time and with the necessary openness is, as mentioned above, no guarantee that the best alternative is chosen. Decision processes take time, in many cases months or years. Often, several parties with divergent assessments and preferences are involved, new problems and solutions arise and conditions change. Therefore, they are often complex and the answer unpredictable. The patterns evident in such processes are called decision logic, a phenomenon that has been researched for many years.

The inherent complexity is illustrated in Table 1, which compares the early phase evaluations of a selection of 23 major public investment projects (Whist and Christensen 2011). Such an analysis provides deep insight into the conditions for ex ante evaluation and, not least, affords reflection on the public quality assurance scheme, particularly the part applicable to the quality assurance of the choice of concept (QA1) but also the part that pertains to the quality assurance of the management system (QA2), which clearly has ex ante features. At the same time, such a unified decision analysis provides clear terms for ex post evaluation and what may be learned about the organization of the processes in major public investment projects.

Of the 23 projects in Table 1, 11 are transport projects, of which two are large road works, two are railway works, three are bridges and underwater tunnels to replace ferry links, two are other tunnel projects and two are building projects. There five defence projects and a variety of other projects, including a cultural centre, a research centre, two hospitals and two sports facilities.

The analysis is broad and brings in several elements of events in the front-end phase. The presentation and discussion is principally of the experience addressing decision analysis. The focus is on the characteristics of the front-end phases of the projects as decision processes and how they may be understood, interpreted and explained. The evaluation technique is emphatically analytical, in the sense that the front-end phase is interpreted through the following four organizational theory perspectives or decision logics.

- 1) Instrumental logic. This logic demonstrates that a particular actor has had relatively clear goals and an understanding of the problems/needs and the solutions/concept (Dahl and Lindblom 1953; March and Olsen 1983). The actor may be a high-ranking leader in the public or private sectors.
- 2) Institutional logic. This logic emphasizes the importance of historical traditions, path dependence and informal decision norms that may modify or tie up instrumental logic (Selznick 1957).

Table 1 Decision logics applied to 23 major public investment projects

Project	Importance of decision logic				Actor constellations and their influence					
	Institutional logic	Instrumental logic	Environmental logic	Contingency logic	The Cabinet was a key actor	The government agency's role vital	Parliament's role vital	External actors play vital role	Coalitions have a vital role	
Defence projects										
New fighter aircraft	++	++	++	+	X	X				
Military data system	++				X	X				
New coastal corvettes, Skjold class	++	++	++	+		X	X		X	
New frigates, Nansen class	++	++	++	+		X				
Malangen torpedo battery	++	++		+		X				
Transport sector projects										
Western intercity train line	+			+	X	X				
Eastern intercity train line	+			+	X	X				
Bjørvika immersed motorway tunnel	++			+	X	X			X	
National border control facility	++	+				X			X	
Finnfast sub-fjord road tunnel	+	+		+						
Ryfast sub-fjord road tunnel	+			+		X			X	
Northern beltway, Trondheim	++			+		X			X	
Jondal road tunnel	++			+		X			X	
Hardanger Fjord suspension bridge	++	+		+		X	X		X	
Værnes airport control tower		+		++		X				
Stad shipping tunnel	+		+	++					X	

Table 1 (continued)

Other projects	Project	Importance of decision logic			Actor constellations and their influence		
	New National Museum of Art	+	+	++	X	X	
	New Opera House	+		+	X	X	
	Olympic Winter Games in Tromsø	++	+		X	X	X
	Arctic research park, Svalbard	++	+	++			X
	Holmenkollen winter sports arena	++		++		X	X
	National University Hospital	++	+		X	X	
	Regional University Hospital	++	+	+			X

- 3) Environmental logic. This logic emphasizes that temporary or long-term occurrences in environments press upon and influence public decision processes, both of a technical and institutional nature (Meyer and Rowan 1977).
- 4) Contingency logic, often also called garbage can theory (March and Olsen 1976). This logic considers temporal effects on the decision process of actors who come and go relative to decisions, and the effects of chance combinations of problems/needs and solutions/concepts.

Instrumental Logic

Instrumental logic incorporates two main aspects of concern in the front-end phases of major public investment projects: political or administrative control and rational calculation. Instrumental logic is understood as a good view into and an understanding of the goal, problem, solutions/alternatives and effects (Dahl and Lindblom 1953; Simon 1957). Accordingly, the ideal for a decision process will be that governmental leaders act based on clearly defined problems and goals, clear views of the possible means and solutions and, not least, the potential consequences of choosing one or another alternative. Ex ante evaluation should be able to induce clear thinking and management in accordance with these ideals. Political and administrative control may be understood as two forms of decision logic: 1) leaders have clear hierarchal control over the front-end phase or 2) leaders and public institutions in part have dissimilar interests and initiate negotiations to hammer out compromises (March and Olsen 1983).

To what degree does the front-end phase reflect the degree of leadership agreement and firm hierarchical control of the processes? The answer is that it varies considerably between and within various types of project. The selected regional and local road, tunnel and bridge projects most strongly reflect the involvement and control of political leaders, most often in interaction and agreement with regional and local competent authorities, that is, The Public Roads Administration. The opposite is true of large defence projects that are characterized by insufficient authority and breakthrough for central executive political and administrative leaders and considerable disagreement with military sector authorities. In other projects that are concerned with for example culture, sports, research, and hospitals, there are clear variations in the degree to which central political leaders break through. The extent ranges from considerable in the New Opera House, the New National Museum of art and the Tromsø Olympic Winter Games projects, to clearly less for the Regional University Hospital and the Svalbard Arctic Research Park projects. Overall, it is surprising that the Government was not more-centrally involved in many of the projects. However, expert authorities are systematically central, which indirectly suggests a considerable potential influence, because of the shared norms among political and expert leadership.

What of tugs of war and negotiations, primarily within the political-administrative apparatus, occur during the front-end phases of projects? These essential aspects underscore the limits of hierarchical control. In the group of road projects, negotiations between political and administrative regional and local actors are vital. Thus, there are many tugs of war to balance the interests of the involved parties and

municipalities, which lead to choices between alternatives and alignment adjustments during a project. These negotiation processes are also important because agreement must prevail to contribute funding and because concurring views are vital towards the State to obtain support in the form of subsidies and toll systems. A clear example of a successful negotiation process is that concerning the Bjørvika immersed motorway tunnel (E18) through Oslo, whereas the process for the Northern beltway (E6) in Trondheim was more disorderly and discordant. In military projects, there is more internal disagreement than actual internal negotiation processes, whereas other projects such as the New Opera House, the Regional and the National university hospitals exhibit a clear internal negotiation process.

The question of rational calculation is tantamount to asking whether the front-end phases of the projects are characterized by clear, well thought-through analyses. The main answer must be no. In approximately half of the projects, the planning and preparations lack many of the features outlined above. The least-pondered projects are the Stad shipping tunnel and the Tromsø Olympic Winter Game projects, whereas the E18 Bjørvika highway, the Finnfast sub-fjord road tunnel, the National customs and traffic border-control facility at Svinesund, the new National University Hospital and the acquisition of new fighter aircraft score relatively high in rational calculation. Only one-fourth of the projects approach the ideal. For these projects, considerable potential exists for an ex ante evaluation that would contribute to greater clarity in the reasoning about the projects.

There are many difficulties in the reasoning about the projects. In some projects, clear goals and problem analyses are completely or partly lacking, as for the Stad shipping tunnel, the control tower at Værnes airport, the Tromsø Olympic Winter Games, the New Opera House, the Arctic Research Park, the Regional University Hospital, the new Holmenkollen winter sports arena, and the new class of coastal corvette and frigate projects. In many of these projects, both problems and solutions were expanded during the project. True, the projects vary considerably in size and complexity, but that seems not to be decisive for how they score on rational calculation.

The instrumental logic aims to explain most of what happens in the front-end phases of projects, particularly in the form of hierarchical management or negotiations but also in rational calculation. This logic most often dominates reasoning on the conduct of rational processes, either in what may be called bounded rationality or in the more concise economic version of it. Our version of rationality focuses more on the importance of organization/control and on organizational reasoning, which may lead to learning that improves the organization of decision processes and perhaps improves the rational calculation.

Institutional Logic

Institutional logic started in what is called “old institutional” reasoning in organization theory (Selznick 1957). Its core lies in public organizations having gradually developed sets of informal norms and values through mutual adaptation to internal and external pressures. Through this institutionalization process, a unique culture or identity evolves in an organization.

Reasoning concerning path dependence is central in institutional logic. The cultural hallmark of an organization at its “birth” continues to influence its further development strongly, a phenomenon called “roots determine routes” in the literature. Another position holds that when an institutionalized organization encounters pressure for change or reform, it will react according to the degree to which the impetus for change agrees with its cultural traditions (March 1994). Changes or reforms are more easily accepted when there is considerable agreement. However, when there is no cultural agreement, the penchant is to avoid change/reform or pragmatically use only some of its elements. With this logic, ex ante evaluation can either point to the necessity of cultural sensitivity in projects or consciously depart from the established cultural track and eventually be innovative.

Military projects exhibit this sort of logic to a great degree. In building the Skjold-class coastal corvettes, the frigates and the Malangen torpedo battery, the point of departure for the competent authorities should have considerable institutional continuity to commit to the same type of military platform. This has contributed to considerable investment in military vessels that are militarily unnecessary or cost too much to operate. This is a negative aspect of tradition and cultural continuity. However, in many other projects, cultural factors conceivably may contribute to strengthening a project.

Culture theory also includes elements of shocks and unbalanced development (Kingdon 1984), implying that public organizations may long follow the same cultural path. However, then comes a dramatic period of change that ends with choosing a new path that thereafter is characterized by continuity (Aberbach and Christensen 2011; Baumgartner and Jones 1993). Such a change of path may be brought about by internal changes, such as a change of Government or political majority, but also may be due to sudden external changes or shock. In the 23 projects analysed, there are several such breaks. An example is the New Opera House; when the former Oslo West railway station was closed, it became a potential location, as happened with the Bjørvika option when the opera was seen in a broader urban development perspective. There was also a critical break after many stages of expanding the National University Hospital in downtown Oslo, in which the new location in the outskirts beyond the main beltway was a radical solution. The opposite is true of the location of the new Regional University Hospital being tied to the city of Trondheim. The same is true of the Tromsø Olympic Winter Games, in which one round of application ties up the next, or the new Holmenkollen winter sports arena, which is tied to the institutional identity of the old location.

The lesson learned in the use of such logic and the other logics is that there never are only advantages or only disadvantages associated with assessing projects from such vantage points. Institutional and cultural continuity may have clear advantages in many projects because they include a form of institutional intelligence; over time, the institutions have become skilled at adapting, which may inform the ex ante evaluation (Boin and Christensen 2008; Kaufman 1976). Activities and efficiency may be improved by following or slightly modifying the historical path. However, the path also may impose a form of trained incapacity or inertia whenever a public organization is too rigid or old fashioned in meeting new challenges, or when it is better at some point to forsake the old path and start anew. In several military projects, this did not happen. The results were cost overruns and failures.

Environmental Logic

Environmental logic focuses on how decision-making processes, in this case those in major public investment projects, are influenced by their ambient environments (Meyer and Rowan 1977). This can happen whenever occurrences and actors in the environment intervene in processes and exert pressure to bring about particular solutions. This can occur through dependencies, coalitions or negotiations with actors in the environment, or through normative social influence towards images and hallmarks, which is seen in connection with pressure to bring in modern reforms and management principles (Christensen and Læg Reid 2007). With such logic, an ex ante evaluation can either contribute realism related to external conditions, such as resources and time, or may contribute to building images of the worth of particular project solutions.

The clearest examples of the importance of environments are evident in military projects such as the Skjold-class coastal corvettes, the frigate project and the new fighter aircraft. The large coalitions that were established were decisive in the outcome. Sectoral military leadership allied itself with the principal defence politicians of the Conservative and Labour parties and the Confederation of Trade Unions, often against executive political leaders and the Chief of Defence. The motives of the coalition focussed on employment for external actors, which defocussed the suitability of projects in terms of other considerations. Throughout, this contributed to costly bad investments, at least for two of these projects. Another type of environmental mechanism was at play in the new Holmenkollen winter sport arena, namely pressure from national and international ski federations, which greatly inflated costs. In the 23 projects investigated, there have been relatively few negative effects from external influences, but again this observation cannot be generalized to infer that such pressure is undesirable. Alliances with private actors can be necessary and useful. This is most evident in the E18 Bjørvika immersed highway and the New Opera House with the surrounding urban development. The State placed considerable pressure on the Municipality of Oslo and on various public and private developers, who together in a coalition are committed to urban development around the Opera, with apartments and commercial buildings. This form of win-win situation is one in which all concerned parties gain and commit themselves.

Contingency Logic

Contingency or garbage can logic entails a profuse mix of problems, solutions, participants and decision possibilities that come and go, in which actors face capacity and attentional problems and decisions appear to be incidental (March and Olsen 1976). A characteristic of contingency logic is that problems and solutions are associated and dissociated, or decoupled and recoupled, and have effects on decisions. Another aspect is that the structures of problems and solutions are particularly complex and unclear. A third aspect is that solutions come before the problem. A fourth is that there is a sort of local rationality in which the focus is solely on one's own project, without placing it in a greater context. In an ex ante evaluation, all such features can lead to deviation from strong management and clear thinking.

The foremost example of coupling and decoupling is found in the two fjordside projects at Bjørvika in Oslo, the New Opera House and the nearby E18 immersed motorway. However, the sequence came about deliberately, not by chance. When the Opera was proposed for approval, it was important to dissociate it from the road project, which was so expensive that it might not have gained financing. The Opera was publicised as a unique, isolated project, although almost everyone realized that the development of the surrounding area presupposed a road solution such as the immersed tube tunnel that finally was chosen, and, not least, further urban development (Whist and Christensen 2012). Once the new Opera project was approved, the road project was again proposed on the strength of arguments including seeing the new Opera as part of a greater urban development.

Four of the transport projects—the two railway projects around Oslo, the Hardanger Fjord suspension bridge and the Ryfast road project—also have elements of dissociation and association to increase the chances of realization. The National Museum at Tullinløkka in the centre of the city is an example. When the Cabinet minister for culture intervened and opened up the possibility of relocation to the old Oslo West railway station, many actors were astounded because they had expected an architectural competition for development at Tullinløkka. These examples are characterized by organized anarchy in which some actors consciously exploit association and dissociation rather than letting chance rule.

There are also several examples of other characteristics of such logic. The structures of problems and their solutions are complex and unclear for E6 Norther beltway, the Jondal road tunnel and the Stad shipping tunnel. Perhaps the Stad shipping tunnel is the foremost example of a solution arising before a problem, but that is also the case for the Arctic Research Park on Svalbard. The foremost examples of local rationality are several of the major defence investment projects in which the projects are not set in a greater picture of military or social needs. However, there is also a pronounced local focus in the E6 Northern beltway, the Værnes control tower and the Regional University Hospital first building phase, which creates various problems.

Assessments and Conclusions

Ex ante evaluation is needed to link the decision processes to the results of overriding reasoning based on facts and systematic analysis. The result of a decision-making process is not necessarily in accordance with this requirement, as has been shown.

The final choice can be better or worse than that recommended at the outset. However, in any case, the best-case result comes from democratic processes that legitimate the outcome. The criteria for ex ante evaluation are often associated with a rational ideal of strong management and clear thinking.

Ex ante evaluations should also build on experience with ex post evaluations, preferably in sufficient numbers to provide a greater scope of experience and, not least, include several alternative courses of action. Moreover, the evaluation criteria in ex ante evaluation correspond to a degree with those of ex post evaluation. This is particularly important in constructing learning loops that function over time. Not least, it is important that ex ante evaluation is made to a central reference in the

subsequent decision-making process against which the various alternative courses of action are evaluated.

The core of the method used here to evaluate and analyse 23 major investment projects as decision-making processes is the employment of a set of logics as “lenses”. This emphasizes various aspects of the processes.

- The instrumental logic emphasizes two central aspects: 1) the degree to which decision-making processes associated with projects are characterized by political and administrative control, and 2) rational calculation or clear organizational reasoning. This perspective is the most relevant for explaining the decision-making processes of the 23 projects. They are characterized by considerable hierarchical control and influence but also by internal coalitions and compromises. Conversely, there apparently is a clear potential for improvement, as implied by the prevalent medium to low scorings in rational calculation. This clearly indicates a potential for strengthening ex ante evaluation.
- The institutional logic focuses on how history and traditions bind, which provides supplementary insights to those of instrumental logic. Particularly for military projects, the historical path carries weight in winning coalitions, which in turn contributes to decisions on problematic investments.
- Employing environmental logic, projects with alliances between the leaders of the armed services and external actors in particular are typical.
- Contingency logic characterizes several projects, but the contingency is more often steered than basic logic indicates. The evaluations of the front-end phases of 23 projects show that dissimilar logics are coupled in various ways in decision-making processes. Even some of the logics point to problematic decisions, either due to lack of goal attainment or excessive costs; there are examples showing that organization and reflecting in other ways contributes to attaining goals and to legitimacy. Forms of organization never have only positive or only negative effects, such that trade-offs are necessary.

What can be learned from such an analysis? First, the decision-making process associated with major public investment projects is complex, which implies that learning should be complex and versatile. It is important to be aware of various considerations and difficult trade-offs. Hence, our analysis functions as an ex post evaluation. At the same time, the absence of clear organizational thought and rational calculation, as a reflection upon the central aspects in the early phase of a project's life, affords considerable potential for ex ante evaluation. Second, ex ante evaluation and its utilization is not an objective or unambiguous process, but rather a political and administrative process. Various actors, such as political and administrative leaders, may use these evaluations in differing ways. Some may interpret them in their own interests and accordingly slant undertakings and learning, whereas others may adhere more closely to conclusions and recommendations suggested by the evaluators. In today's modern societies, it is relatively common that either evaluations are clearly managed, or that results are interpreted, slanted, politicized and oversold. This analysis may contribute to more control and greater breakthrough but also may undermine the credibility of and support of projects.

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